PENANG SANGAM HIGH SCHOOL
DEPARTMENT OF MATHEMATICS/PHYSICS
YEAR 11 MATHEMATICS - WEEK 18

STRAND 4 **GRAPHS**

4.1 GRAPHS

Learning Objective
At the end of this lesson, students should be able to:
- Draw cubic graphs

Graphing Cubic Functions

To sketch the graph of a cubic function given in the factorized form:

1) Calculate the y – intercept
2) Calculate the x – intercept
3) Plot these points
4) Sketch the graph. Turn the curve in between x – intercepts in about the middle to pass through all other points

Note

1) Shapes of cubic graph

Graph	Positive Shape	Negative Shape
Cubic function		

2) To check where the sketch starts take a point to the left and to the right of the outside x – intercepts and calculate the sign of y (i.e. whether it is positive or negative by substituting these values for x in the equation). This will tell us whether the graph starts above or below the x – axis in those regions.

Example 1: Sketch the graph of $y = (x+2)(x-3)(x+5)$

y-intercept: Let x = 0

$y = (x+2)(x-3)(x+5)$

$y = (0+2)(0-3)(0+5)$

$y = (2)(-3)(5)$

$= -30$

x-intercept: Let y = 0

$y = (x+2)(x-3)(x+5)$

$0 = (x+2)(x-3)(x+5)$

$x+2=0$

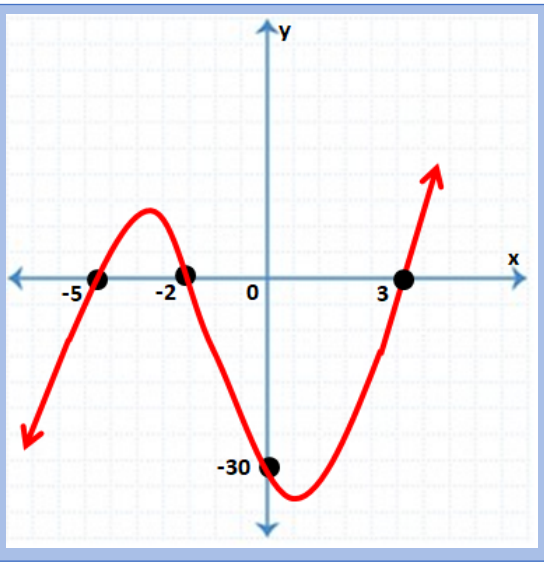
$x+2-2=0-2$

$x-3=0$

$x-3+3=0+3$

$x+5=0$

$x+5-5=0-5$



Example 2: **Sketch the graph of** $y = -(x-2)(x+1)^2$

y-intercept: Let x = 0

$y = -(x-2)(x+1)^2$

$y = -(0-2)(0+1)^2$

$y = -(-2)(1)^2$

Shape $\rightarrow$ $-ve$ 

x-intercept: Let y = 0

$y = -(x-2)(x+1)^2$

$0 = -(x-2)(x+1)^2$

$\frac{0}{-1} = \frac{-1(x-2)(x+1)^2}{-1}$

$x-2=0$

$x-2+2=0+2$

$(x+1)^2=0$

$x+1=0$

$x+1-1=0-1$

$x=-2$

$y = -(x-2)(x+1)^2$

$y = -(-2-2)(-2+1)^2$

$x=3$

$y = -(x-2)(x+1)^2$

$y = -(3-2)(3+1)^2$

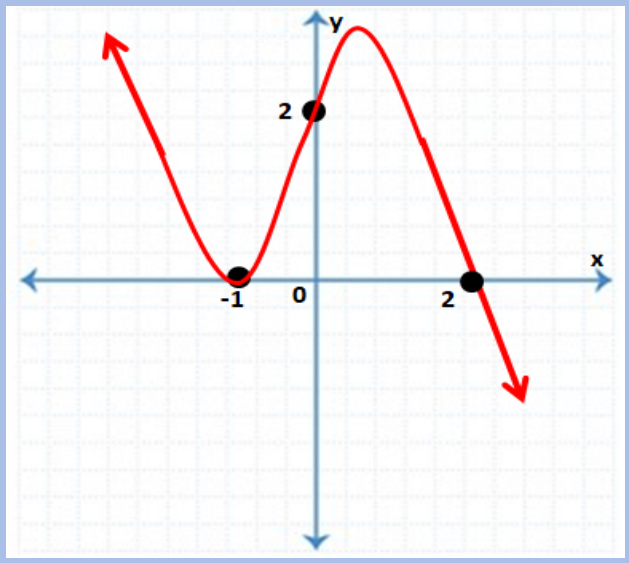
$y = -(x-2)(x+1)^2$

So the graph starts above the x – axis on the left and below the x – axis on the right

Even power

$\therefore$ *Turning point*

at $x = -1$



Exercise: Sketch the graph of each of the following. Show all intercepts clearly.

1) $y = (x+1)(x-2)(x+3)$

2) $y = (x + 2)^2(1 - x)$